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Ships and marine technology — Launching appliances for davit-launched liferafts

Navires et technologie maritime — Engins de mise à l'eau des radeaux de sauvetage sous bossoirs

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13122 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 4, *Outfitting and deck machinery*.

Introduction

This International Standard forms a code of practical interpretation and amplification of the requirements of the International Convention for the Safety of Life at Sea (SOLAS). It provides an identical basis for design, construction and acceptance of launching appliances for davit-launched liferafts for use by ship-owners, shipbuilders and appropriate organizations.

Automatic release hooks are usually considered as independent equipment for statutory survey and have to obtain type approval and undergo acceptance testing by the authorities or their delegates. There are special requirements for their design, construction and acceptance testing stipulated by the IMO (International Maritime Organization). It is therefore intended that an International Standard specific to the automatic hook be drafted separately.

This International Standard is mainly based on amendments to SOLAS 1974, dating from 1983 to 1996, and related IMO resolutions and protocols, in particular Resolutions MSC.47(66), MSC.48(66), MSC.81(70), MSC.216(82), MSC.218(82) and MSC.226(82). It also refers to IMO circulars MSC/Circ.1205[1)] and MSC/Circ.1206[2)].

1) *Guidelines for Developing Operation and Maintenance Manuals for Lifeboat Systems.*

2) *Measures to Prevent Accidents with Lifeboats.*

Ships and marine technology — Launching appliances for davit-launched liferafts

1 Scope

This International Standard specifies requirements for the performance, design, construction, operation, safety, inspection, maintenance, and testing and acceptance of launching appliances for davit-launched liferafts (hereinafter referred to as “liferafts”) installed on a variety of sea-going ships.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15516, *Ships and marine technology — Launching appliances for davit-launched lifeboats*

ISO 2944, *Fluid power systems and components — Nominal pressures*

ISO 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 4414, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

IEC 60092 (all parts), *Electrical installations in ships*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15516 and the following apply.

3.1
non-loaded liferaft
liferaft fully equipped without persons

3.2
fully loaded liferaft
liferaft fully equipped and loaded with a full complement of persons

NOTE The mass of each person is taken as being 82,5 kg.

3.3
maximum working load
load assigned by the design applied to the release hook of a launching appliance during launching of the maximum weight of the fully loaded liferaft it serves

3.4
recovering load
load assigned by the design applied to the release hook of a launching appliance during recovering of the maximum weight of the non-loaded liferaft it serves

3.5
maximum working load of winch
maximum load assigned by the design held by the falls at the winch drum when the launching appliance is launching or recovering the maximum working load

3.6
hoisting load of winch
load assigned by the design held by the falls at the winch drum when the launching appliance is hoisting the recovering load

3.7
davit
major structure of the launching appliance, generally composed of frame, davit arm and fittings, etc.

3.8
winch
mechanism of the launching appliance used for launching and recovering the liferaft

3.9
turning device
device of the launching appliance used for slewing or swinging the davit arm so as to bring the liferaft from inboard to outboard or vice versa

3.10
automatic release hook
hook used for suspending the liferaft with the function of lowering and automatically releasing the liferaft when waterborne

4 Performance

4.1 A launching appliance shall depend only on manpower, gravity or stored mechanical power that is independent of the ship's power supplies to safely turn out the non-loaded liferaft it serves from inboard to full outboard, ready for embarking and lowering the liferaft with the ship against a trim of up to 10° and list of up to 20° either way.

4.2 A launching appliance shall not depend on any means other than gravity or stored mechanical power independent of the ship's power supplies to lower the liferaft it serves with the ship against a trim of up to 10° and list of up to 20° either way.

4.3 A launching appliance shall be capable of safely lowering the liferaft in a controlled manner, and the speed at which the liferaft is lowered to the water shall conform to Table 1.

4.4 The loose gears and automatic release hook shall have sufficient total weight to overcome the friction in the davit reeving system, so as to lower freely the non-loaded release hook (referred to hereinafter as "non-loaded hook").

4.5 A launching appliance shall be capable of manually recovering a non-loaded liferaft from the water to the deck with the ship on an approximately even keel.

4.6 Where a launching appliance serves to launch several liferafts, a manually operated means for the rapid recovery of the non-loaded hook shall be provided; it shall be ensured that all the liferafts it serves capable of being lowered are brought to the water within 30 min for a passenger ship or 10 min for a cargo ship.

In order to quickly bring the non-loaded hook to the next liferaft, the launching appliance shall be provided additionally with a recovery pulling line.

Table 1 — Liferaft lowering speed

Condition of liferaft	Limit	Lowering speed S
Fully loaded liferaft	Lower limit	$S = 0{,}4 + 0{,}02H$ where S is the lowering speed in metres per second (m/s); H is the height in metres from the davit head to the waterline with the ship at the lightest seagoing condition, without consideration of trim and list given in 4.1, and with the davit arm in the full outboard position. Regardless of the values obtained using this equation, the maximum values shall not exceed 1 m/s, unless otherwise stipulated by the relevant authority.
	Upper limit	1,3 m/s, unless otherwise stipulated by the relevant authority
Non-loaded liferaft	Lower limit	0,1 m/s, unless otherwise stipulated by the relevant authority

5 Design

5.1 A launching appliance shall be constructed using materials that will not be damaged in stowage throughout an air temperature range of −30 °C to +65 °C.

5.2 All materials exposed to weather shall possess excellent resistance to corrosion and deterioration, or shall be protected by galvanizing or other effective means.

5.3 The major structural components, such as davit arm, frame and sheave block, shall be made from materials such as steel plates, tubes or profiled bar that meet the requirements for seagoing conditions and have satisfactory weldability. Their minimum thickness shall be not less than 6 mm, unless they are of stainless materials with sea-water corrosion resistance.

5.4 Loose gears such as lifting chains, shackles and eye plates shall be made of ductile materials; grey iron castings shall not be used.

5.5 A launching appliance shall be designed to have the minimum safety factors in accordance with Table 2, on the basis of the maximum load applied to those major parts and corresponding to the ultimate strength of their materials.

Table 2 — Minimum safety factors

Launching appliance parts	Minimum safety factor
Loose gears, falls, release hook	6
Davit arm, frame and their fittings	4,5
Winch, turning device	4,5

5.6 A launching appliance shall remain effective under the condition of icing.

5.7 Launching appliances shall be constructed so as to reduce routine maintenance to a minimum. All parts requiring regular maintenance shall be readily accessible and easily maintained by the ship's crew.

6 Construction

6.1 General

A launching appliance generally consists of loose gears, davit, turning gear, winch and automatic release hook, etc. It may be specifically designed for launching and recovering the liferaft, or as a combined launching appliance for multi-purpose functions, as long as those functions do not interfere with each other. Whatever the design, all relevant requirements for launching or recovering the liferaft are to be met by the launching appliance for conformance with this International Standard.

Launching appliances shall be ready for immediate use at all times.

6.2 Loose gears

6.2.1 The falls used for hoisting and lowering the liferaft shall be rotation-resistant and of galvanized steel wire rope or others having high resistance to corrosion.

6.2.2 Falls shall be long enough so that at least three dead turns of rope remain on the winch's drum after the liferaft has been successfully lowered to the water, with the ship in its lightest seagoing condition and under the unfavourable conditions of a trim of up to 10°and list of up to 20° either way.

6.2.3 The sheave diameter at the bottom of the sheave groove shall be at least 12 times the diameter of the falls, and the depth of the sheave groove shall be at least 1,5 times the diameter of the falls.

A sheave cover with a small clearance between cover and sheave shall be provided to prevent the falls from coming out of the sheave groove.

6.3 Davit

6.3.1 During turning-out of the davit to the full outboard position and with the ship under the unfavourable conditions of a trim of up to 10° and list of up to 20° either side, the davit arm and frame and their fittings shall be of sufficient strength to withstand a dynamic load caused by a lowering and braking of 1,1 times the maximum working load, and shall be able to withstand a static load of 2,2 times the maximum working load with the launching appliance in the worst-case trim and list conditions.

6.3.2 The davit arm shall be so arranged that it has sufficient outreach to successfully lower the liferaft in a fully inflated condition to the water.

6.4 Turning device

6.4.1 The turning device may be designed to be power-driven or to be driven by stored mechanical power or manpower; nevertheless, all launching appliances shall be fitted with a turning device that can at least be driven by manpower. In turning out, the davit arm shall bring the non-loaded liferaft it serves to full outboard with the ship under unfavourable conditions of trim and list.

6.4.2 Where the turning device is power-driven, it shall be fitted with a brake in order to stop the turning davit arm at the prescribed position with the ship under unfavourable conditions of trim and list.

6.5 Winch

6.5.1 A winch may be designed to be electrically, hydraulically or pneumatically powered, or to be driven by manpower.

6.5.1.1 Where driven by manpower, the rotation radius of the handles or hand wheels of the winch shall be not more than 500 mm and the continuance force for hand operation shall not exceed 160 N, unless otherwise stipulated by a relevant authority.

6.5.1.2 Electrical drives and control equipment shall conform to the requirements of IEC 60092. Deck-mounted enclosures of motors and controller shall conform to IEC 60529, IP56.

6.5.1.3 Hydraulic drives and control equipment shall conform to the requirements of ISO 4413. System nominal pressures shall be selected from ISO 2944, and the drive shall operate satisfactorily at a pressure 10 % below the selected nominal pressure.

6.5.1.4 Pneumatic drives and control equipment shall conform to the requirements of ISO 4414. System nominal pressures shall be selected from ISO 2944, and the drive shall operate satisfactorily at a pressure 10 % below the selected nominal pressure.

6.5.2 Each winch shall be fitted with brakes capable of stopping the descent of a fully loaded liferaft at the maximum lowering speed and of holding it securely. The winch brake shall be of sufficient strength to withstand a static load of 1,5 times the maximum working load and a dynamic load produced by braking at 1,1 times the maximum working load at the maximum lowering speed.

The brake used for controlling the lowering of the liferaft shall be so designed as to be always applied unless held in the “OFF” position by the operator. Brake pads shall, where necessary, be protected from water and oil.

6.5.3 The transmission case of a winch shall be so arranged within an enclosure that only minimum daily maintenance is required. A winch’s gears and bearings shall be well lubricated with the ship under unfavourable conditions of trim and list.

6.5.4 Each winch shall be fitted with a one-way clutch or other equivalent device to make the winch automatically disengage from the motor when the liferaft is lowered by gravity.

6.5.5 Each winch shall be fitted with a speed regulator to control the lowering speed of the liferaft when the liferaft is lowered by gravity.

6.5.6 The nominal diameter of the drum shall be not less than 16 times the diameter of the wire rope. The outer edges of the drum’s flanges shall be at least 1,5 times the diameter of the wire rope beyond the top layer of rope.

6.5.7 A powered winch shall be fitted with a hand gear for hoisting the non-loaded liferaft it serves in the event of a power failure.

6.5.8 Where the winch serves to launch several liferafts, it shall be fitted with an additional manual device for rapid recovery of the non-loaded hook.

6.6 Automatic release hook

6.6.1 The launching appliance shall be provided with an automatic release hook or a combined release hook with an equivalent capability for hoisting and launching the liferaft.

6.6.2 The release hook shall have the capability of automatically releasing the liferaft when the liferaft is waterborne, and also preventing premature release during lowering. The release hook shall be impossible to release automatically unless activated by the operator in accordance with this International Standard.

6.6.3 The release hook shall have the capability of manually releasing the liferaft in an emergency condition, in case of failure of the release hook's automatic release.

7 Operation and safety

7.1 The launching appliance shall be so arranged that it may be controlled by one person from a position on the ship's deck. This operator beside the equipment shall be able to observe the liferaft at all times during lowering or recovering.

7.2 The launching appliance shall also be capable of being remotely controlled during lowering of the liferaft from a position within the liferaft.

7.3 The launching appliance shall be fitted with limiting devices to prevent moving overtravel of the davit arm and the liferaft. The power shall be automatically cut off before the turning of the davit arm or the hoisting of the release hook arrive at the prescribed position, thereby avoiding possible damage of the parts concerned due to impact.

7.4 The launching appliance shall be fitted with an interlock device to prevent injury to the operator due to the accidental rotation of the hand gear handle or hand-wheel when the liferaft is being lowered by gravity or hoisted by power.

7.5 The parts used for controlling the action of the launching appliance (handles, handwheels, push buttons, levers, lanyards, etc.) shall be clearly and permanently marked with instruction plates indicating their purpose, operating procedure and a warning notice.

7.6 The winch control device shall return to the stop position automatically after operating and shall be fitted with a stop switch for shutting off power in an emergency,

8 Inspection and maintenance

8.1 Each launching appliance shall be provided with a maintenance manual having figures, written in the working language of the ship and including a checklist, maintenance and repair instructions, schedule of periodic maintenance, lubricating instructions, list of spare parts and provision for recording maintenance and repairs.

8.2 A visual inspection shall be carried out at least once a week to ensure that the launching appliance is at all times ready for immediate use.

8.3 An inspection shall be carried out at least once a month in accordance with the maintenance manual of those parts which could easily sustain damage. Moreover, an action test should be performed without lowering to the water, as necessary, in order to ensure the launching appliance is in good operational condition; for example, under the condition of no load, perform a slewing test, lowering test and hoisting test of the launching appliance and test the hand operation of the release hook.

8.4 A thorough examination shall be carried out in accordance with the maintenance manual at least once a year. Repair and replace any defective parts due to damage and excessive wear. Check and adjust every operation of the launching appliance, then carry out a braking test when lowering under a load equal to the weight of the non-loaded liferaft.

An operational test for launching and braking with 1,1 times the maximum working load should be performed at intervals not exceeding five years.

8.5 Falls shall be inspected periodically with special regard to areas passing through sheaves, and shall be renewed whenever necessary due to deterioration of the falls or at intervals of not more than five years, whichever is the earlier.

8.6 The release hook shall be overhauled at least once every five years. After such overhauling, an operational test with 1,1 times the maximum working load shall be performed.

9 Test methods

9.1 General

According to the practical conditions specified by the manufacturer, the tests given in 9.2 to 9.4 (see Tables 3 to 5) may be carried out together, provided that the acceptance criteria for each are met.

9.2 Loose gears

The test items, loads, procedure and acceptance criteria for testing loose gears shall be in accordance with Table 3.

Table 3 — Loose gears testing

Test item	Test load	Test procedure	Acceptance criteria
Static test	2,2 × maximum working load	Apply the test load for 5 min.	No permanent deformation or damage.

9.3 Winch

The test items, loads, procedure and acceptance criteria for testing a winch shall be in accordance with Table 4.

Table 4 — Winch testing

Test item		Test load	Test procedure	Acceptance criteria
1	**Non-load test**	0	Run for 10 min.	Smooth start and stop, easy operation. No abnormalities in temperature, noise, interlocking oil seal and braking.
2	**Powered hoisting test**	Hoisting load of winch	Hoist the test load up to a sufficient height and then brake, measuring the hoisting speed. Repeat the test at least twice.	Smooth running, secure braking. The hoisting speed complies with design requirement.
3	**Lowering tests**	Weight of fully loaded liferaft it matches	Hang the test load at a sufficient height, then lower it by gravity through a distance of 3~4 m, measuring the lowering speed. Repeat the test at least twice.	Brake works well. The lowering speed complies with the requirements of 4.3.
4		Weight of non-loaded liferaft it matches	Hang the test load at a sufficient height, then lower it through a distance of 3~4 m, measuring the lowering speed. Repeat the test at least twice.	Brake works well. The lowering speed complies with design requirement.
5	**Dynamic testing of brake**	1,1 × max. working load of winch	Hang the test load at a sufficient height, then release the brake to lower it through a distance of at least 3 m, applying the brake abruptly when the lowering speed reaches maximum. Repeat the test at least twice.	Brake works well. The drop of the test load shall be less than 1 m.
			Repeat the test with the brake surface wetted if the brake is exposed to the weather.	Brake works well. The drop of the test load shall be less than 1,2 m, unless otherwise stipulated by the relevant authority.
6	**Static testing of brake**	1,5 × max. working load of winch	Hang the test load to the fall from the outmost layer of the drum. Lower it through at least a complete revolution of the drum, then apply the brake.	The test load is held by the brake. No deformation or damage affecting performance.
7	**Manual hoisting tests**	Hoisting load of winch	Hoist the test load manually to a sufficient height.	Smooth operation. The hand-operating force complies with the design requirement.
8		1,5 × total weight of loose gears and release hook	Hoist the test load manually to a sufficient height.	Smooth operation. The hand-operating force complies with the requirements of 6.5.1.1. The hoisting speed complies with the design requirement.
9	**Stripping for inspection**	—	Overhaul the winch and inspect its parts.	No evidence of damage or excessive wear found.
The various tests should achieve a cumulative lowering distance of at least 150 m.				

9.4 Launching appliances

The test items, loads, procedure and acceptance criteria for testing launching appliances shall be in accordance with Table 5.

Where the launching appliance is driven by a hydraulic system, a pressure test of 1,5 times nominal pressure shall be carried out on the hydraulic system.

Table 5 — Launching appliance testing

Test item		Test load	Simulated	Test procedure	Acceptance criteria
1	**Turning-out and lowering tests**	No load on hook	Even keel	Turn-out the davit arm to the full outboard position, then lower	Smooth turning-out, successful lowering
2			Inboard list of 20° and trim of 10°		
3	**Recovering test**	Recovery load	Even keel	With the davit arm at the full outboard position, hoist the test load, then return it to its original inboard position. Repeat the test at least twice.	Smooth work. Limiting device and brake work well.
4	**Launching test**	1,1 times max. working load	Even keel	With the davit arm at the full outboard position, lower the test load, then control the release hook for automatic release in accordance with the instructions for the release hook, lowering the load until it strikes the ground or water surface. Repeat the test at least twice.	During lowering, the release hook does not automatically release with the load still applied, but the release hook automatically releases when it strikes the ground or water surface.
5	**Dynamic tests for lowering**	1,1 times max. working load	Even keel	With the davit arm at the full outboard position, lower the	Smooth operation. No deformation or damage affecting
6			Inboard list of 20° and trim of 10°		
7	**Static tests**	2,2 times max. working load	Even keel	With the davit arm at the full outboard position, hang the test	No deformation or damage affecting performance.
8			Inboard list of 20°		
9			Outboard list of 20°		

10 Acceptance code

10.1 Prototype testing

10.1.1 Prototype testing shall be performed in any of the following situations:

a) the first time a model of the launching appliance is manufactured by a manufacturer;

b) where significant revisions have been made to construction, material and workmanship which may affect performance of the launching appliance;

c) where there is a great difference between the result of works production tests and the result of the last prototype test;

d) where the approval authorities require a prototype test to be carried out again.

10.1.2 Prototype testing of the launching appliance shall be carried out in accordance with Table 5. Before this test, the approval information of the release hook shall first be verified, then the prototype test of the loose gears and the winch shall be carried out in accordance with Tables 3 and 4.

10.2 Production testing

After a prototype test has been completed for a launching appliance model, a product of the same model shall pass works production testing as follows.

a) Verify the approval information of the release hook.

b) Carry out a production test on the loose gears in accordance with Table 3.

c) Carry out a production test of the winch in accordance with items 1 to 8 of Table 4.

d) Carry out a production test of the launching appliance in accordance with items 1, 3, 4 and 5 of Table 5.

11 Marking

11.1 Marking shall be conspicuous, clear and anti-corrosive and shall be securely fixed.

11.2 Each launching appliance shall be marked with the following:

a) name of the launching appliance;

b) model and manufacturer serial number;

c) manufacturer's name and address;

d) maximum working load and recovering load;

e) date of manufacture;

f) acceptance mark.

11.3 Each launching appliance shall have an approval certification.

11.4 A launching appliance which complies with this International Standard should be marked with "ISO 13122".

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Price based on 10 pages